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General Instructions

This procedure covers the following service intervals:

- Semi-Annual
- Annual

Use this procedure in conjunction with the UroView 2800 Periodic Maintenance (PM) Checklist form. For the Semi-Annual PM, do only those procedures listed in the Semi-Annual section of the form. For the Annual PM, do all the procedures in both sections. Within those sections, the procedure names you see on the form correspond to instructions in this procedure document.

How To Use The Electronic Checklist Form

The 2800 Periodic Maintenance Checklist form has been designed using the Microsoft® Word 2000 form tool and should be completed on-line. The on-line form contains three types of information fields: text/number fields, checkboxes and pull-down menus.

You can navigate the form using the tab key or by using your mouse. We recommend that you use the mouse. The steps should be completed in a vertical order. The tab key tabs horizontally.

For text fields, type in the requested information, such as hospital name, etc. For checkboxes, place the mouse cursor on the checkbox and click. This will place an X in the checkbox. For pull-down menus choose the appropriate selection when it is displayed and verify that it is present when you close the field.

To make the on-line PM checklist template available to MS Word, save the template in the Microsoft Office Template directory.

Getting Started With the Checklist

Enter the following required information at the top of the form prior to performing the PM test procedures

1. System ID number in the text field.
2. Start Date in the text field.

3. Read the elapsed time meter on the Workstation and enter the number on the Checklist.
4. Select whether the PM is semi-annual or annual from the pull-down menu.
5. Complete the customer information: Customer Name, Address, etc.
6. Record the following in the Test Equipment block:
   A. Test equipment model numbers
   B. Test equipment serial numbers
   C. Test equipment calibration due date

Note: Test equipment must have current calibration dates. Do not use test equipment with expired calibration stickers.

Safety

Ingress Of Water And Solutions

The system must never be operated or stored in locations where conductive fluids, like water and saline solution, might spill on the equipment.

Always unplug the AC power cable from the wall outlet before cleaning the equipment. Do not allow water, soap, or other liquids to drip into the equipment and cause short circuits, electric shock and fire hazards.

Unauthorized Modifications

Under no circumstances should the safety interlock in the system be a bypassed, jumpered, or otherwise disabled.

***Note**: All GE OEC systems comply with International Electrotechnical Commission safety standard IEC-60601. Do not connect any external device to the system that does not meet the requirements of IEC-60601. Only devices provided or approved by GE OEC Medical Systems, Inc. should be connected to the system.*

Motorized Mechanical Operation

The table and X-ray arm are motorized and should be observed continuously during operation to avoid collision with people and equipment.

If covers are removed, use extreme care when operating motorized features. Do not wear loose clothing that may be caught by mechanical mechanisms. Keep hands, fingers, hair, or other body parts clear of motorized equipment while the motors are in operation.

Trained Service Personnel

Serious injury and property damage can result from incorrectly performed service procedures. Observe all operating and safety procedures discussed in this document.

WARNING: *Procedures shall be performed by service personnel specifically trained by GE OEC Medical Systems, Inc. to calibrate the UROVIEW 2800.*

Electrical Shock

WARNING: *This system can generate lethal voltages. Practice safe electrical testing procedures when performing periodic maintenance procedures.*

WARNING: *After taking X-rays, the high voltage cables can retain a lethal charge, even if you power down the system. Even though the contacts are recessed, high voltages can arc several inches from their terminals if the cables are removed from the connector wells. Use caution when disconnecting high voltage cables even when the power is turned* ***off****. If you remove these connections, immediately discharge their contacts against the high voltage tank case (ground).*

WARNING: *Use caution when working near the generator and its connections. Remove metal rings and watchbands that may inadvertently come in contact with the terminals. Severe skin burns could result if such metal articles were shorted across the generator input terminals.*

X-radiation Exposure

The X-ray tube assembly produces X-radiation when energized. Never operate this device without X-ray shielding in place. Use lead shielding and draping to protect personnel.

WARNING: *Lead aprons, radiation monitors, and appropriate radiation shields must be utilized for the protection of all personnel in the vicinity while performing tests. Living human anatomy should never be used as a phantom or demonstration aid. Do not produce radiation in hallways.*

CAUTION: *Many of the PCB's in this system contain components, which are sensitive to Electro-Static Discharge (ESD). Observe ESD safety procedures.*

Required Tools, Test Equipment, and Supplies

Tools

Spline Driver, .048, (00-900921)

High voltage cable wrench

Metric and SAE Allens (metric set to include half sizes)

Metric and SAE Socket set and or nut drivers (metric set to include half sizes)

Supplies

Alcohol Prep Pads

Laceration Proof Gloves

Safety Glasses

Tungrease (00-902208)

Paint Kit, touchup

Shim, Tower Base, .125SS qty 4 (00-987198-01)

Shim, Tower Base, .250SS qty 4 (00-987198-02)

Test Equipment

Digital multimeter and probes
Pausch Serial Extension Cable (81-821528)
Digital level (00-902160)
Laptop computer
Film densitometer
Plexi Glass Phantom Kit (00-884334-01)
Dosimeter
Fiber Optic Kit (00-884422-01)
VGA Monitor00-901163-01
Light meter
Converging line pair resolution tool
Perpendicularity tool (00-874185)
Radiographic Alignment Tool (00-871980)
3 copper filters (00-877682)
Static wrist strap (00-800221)
RUS Software (00-884048)
RUS Cable (00-901559)
Keyboard00-900598-01
Lemo Socket Tool T-00207

Safety Inspections

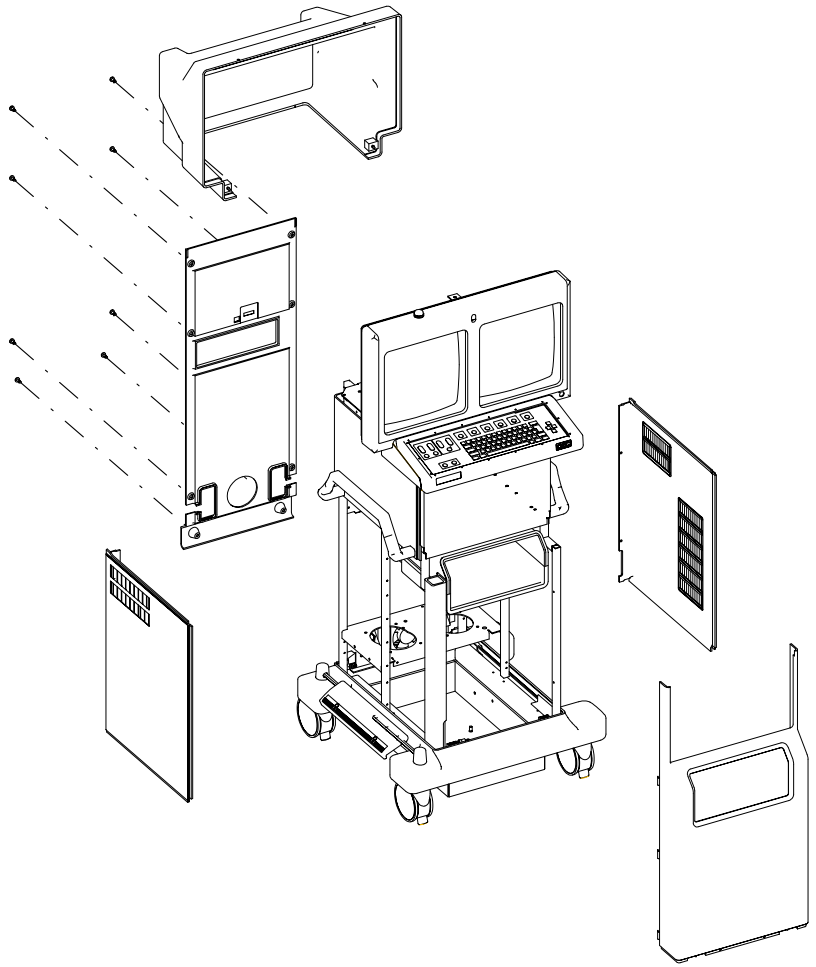
Remove Power and Covers

Refer to the illustrations following this page for cover removal.

WARNING: *Electrical circuits inside the equipment use voltages that are capable of causing serious injury or death from electrical shock,* ***even when the Workstation power switch is turned off****. Use appropriate lockout/tag-out precautions.*

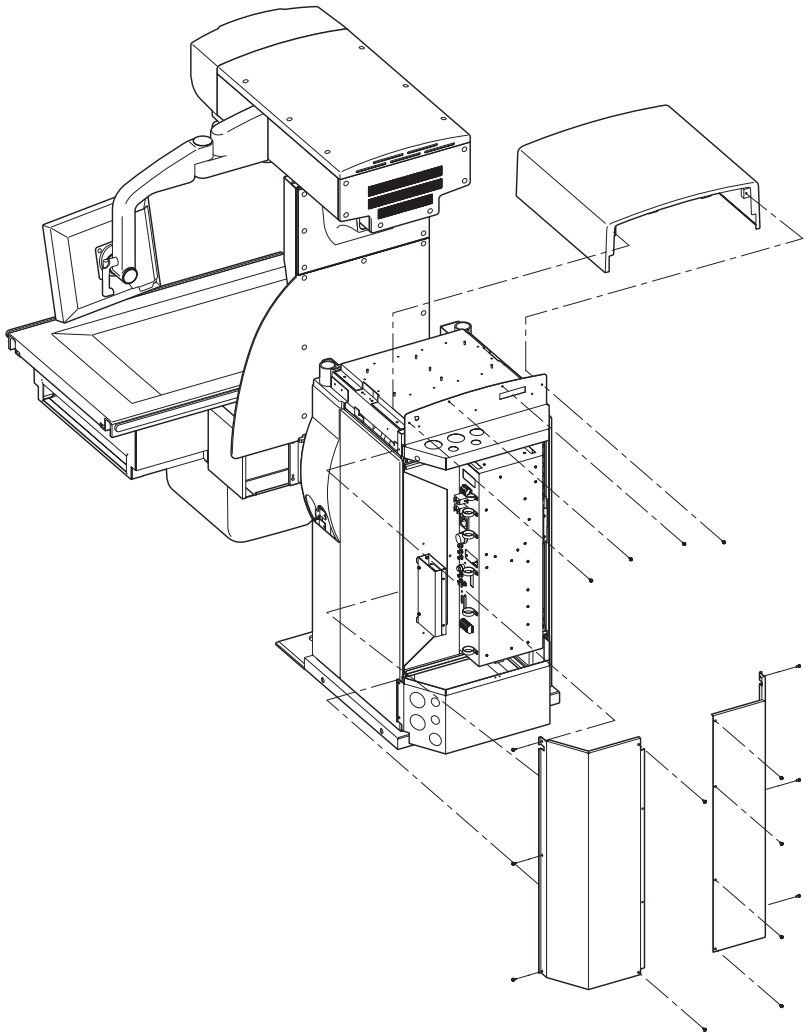
1. If the system has power applied, place the Workstation power switch in the **OFF** position

2. At the facility power distribution box, shut off all power, including as applicable 200-208 VAC and 400-480 VAC. Use lockout/tag-out procedures in compliance with GE OEC safety policies.
3. Separate generator from tower or wall box. Move generator 3 or 4 feet away from tower or wall.
4. Remove the generator covers.
5. Remove the Workstation rear cover, left side cover, and open the electronic card rack rear door.
6. Remove the Tower top and end covers.
7. Remove table movement mechanism covers.

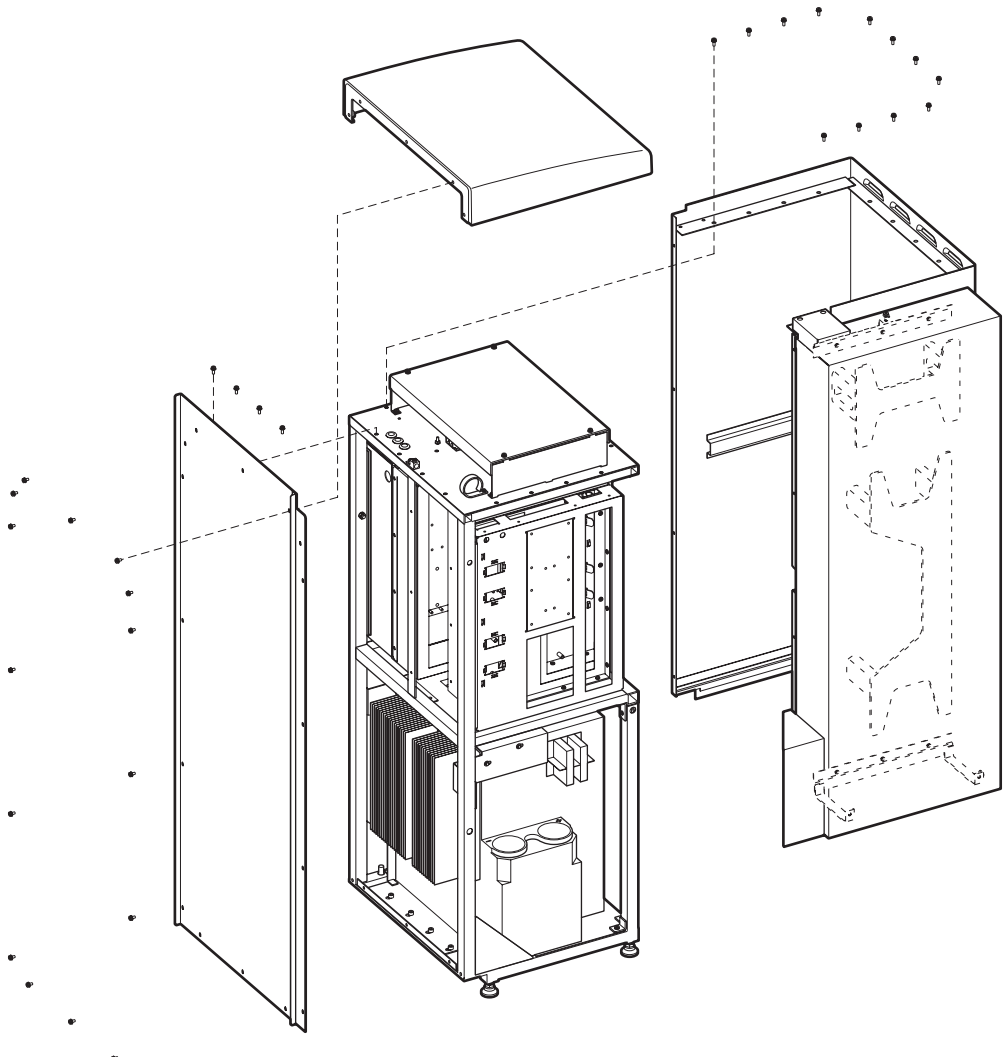


Removing the Workstation Covers

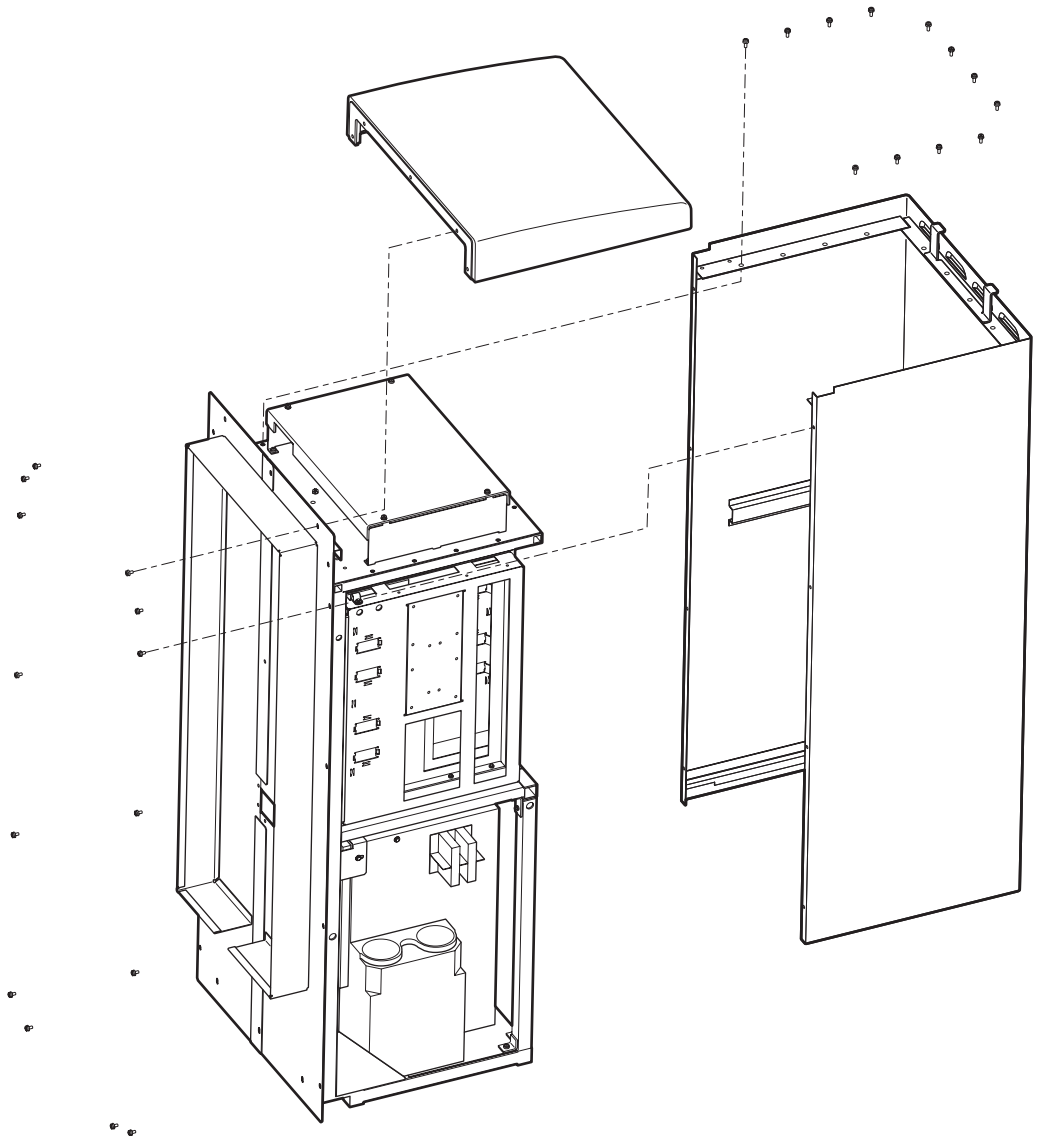
Removing Tower Side Covers



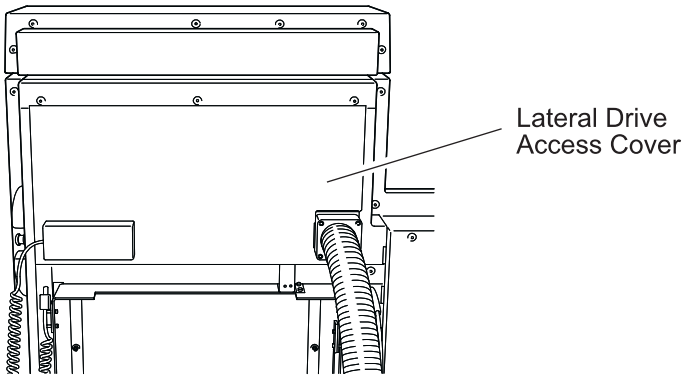
Removing the Tower Top and Upper End Covers



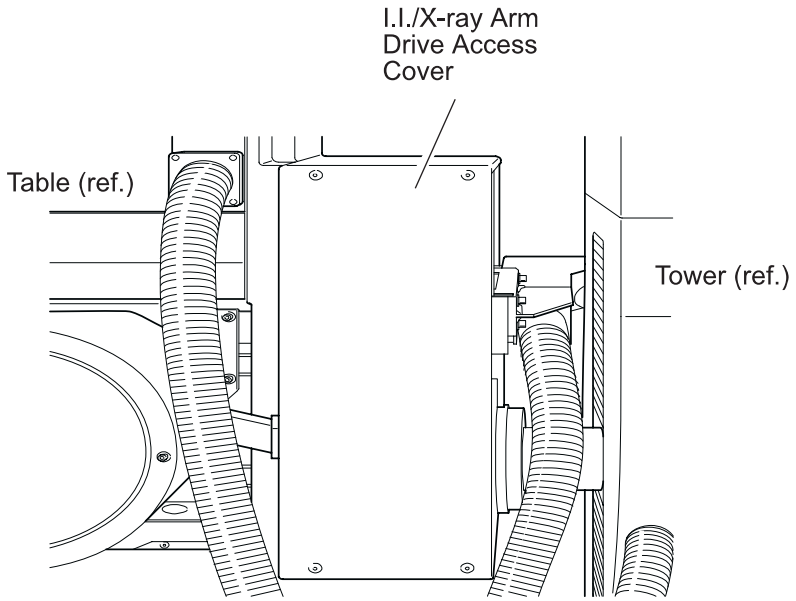
Removing the Generator Covers (Tower Mounted)



Removing the Generator Covers (Remote Mounted)



Note: Underside view of table in vertical position, head end.



Note: Left-hand system shown.

Table Cover Removal

Mechanical Inspections

Brakes

Engage the Workstation's wheel brake and then push the Workstation and verify that the caster/wheel assemblies are locked in position and do not move.

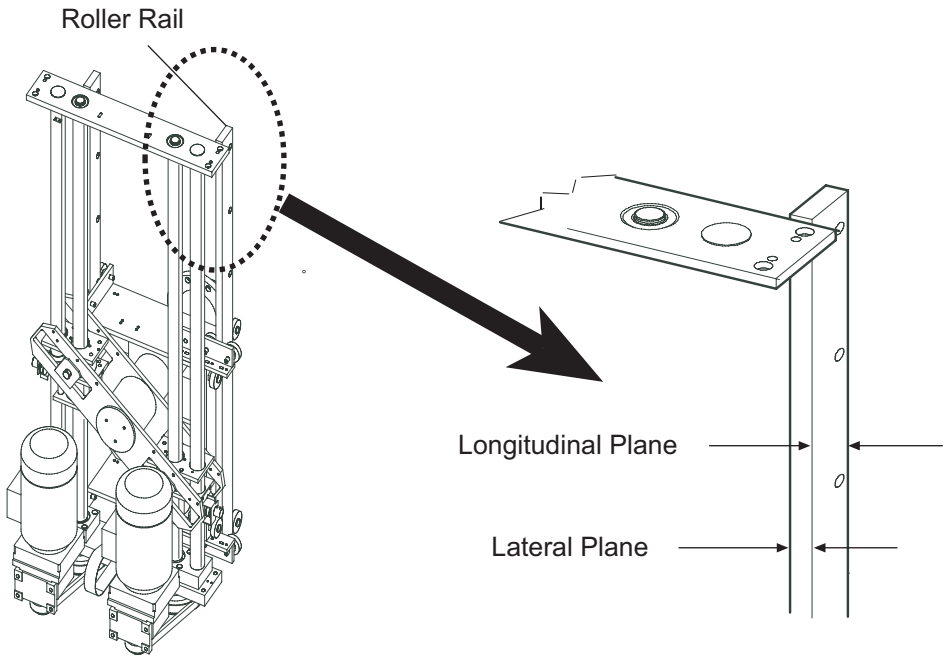
X-ray-Arm

Move the horizontal cross-arm from stop to stop, verifying the following:

1. Easy separation in the exposure position.
2. Easy separation in the park position.
3. Even movement.
4. Positive engagement into the limit positions.

Tower Mounting

Check tower mounting bolts, verifying that they are snug. Check level of tower on the lateral and longitudinal planes at either lift/tilt roller rail (see following figure). If more that one-half bubble off, shim as necessary to level.



Checking Tower Level

Electrical Inspections

Electrical Power Cord

Inspect the Workstation's AC power cable for damage and wear. Verify the presence of the AC ground pin.

Interconnect Cable

Inspect the interconnect cable; verify that the cable, and pins are not damaged. Verify the LEMO connector strain relief is tightened securely.

Hand Control and Foot Switches

1. Check external cables and connectors for signs of damage or wear.
2. Verify that all the buttons and LEDs work.

Table Motion and X-ray Arm Motion Tests

In these checks, turn on facility power only for the single-phase circuits. On the back of the tower, press the power switch (SW1).

Table Vertical

Check the following table motions:

1. Movement initiated from the hand control unit.
2. Movement initiated from footswitch.
3. Soft start and smooth operation through entire range of travel.
4. Automatic stop in the bottom and top positions.

Table Tilt

Check the following table motions:

1. Movement initiated from hand control unit.
2. Movement initiated from footswitch.
3. Soft start and smooth operation through entire range of travel.
4. Automatic stop in Trendelenburg position (-20°).
5. Automatic stop in horizontal limit position (0°).
6. Automatic stop in vertical limit position (+88°).

I.I./X-ray Arm

Check the following table motions:

1. Movement initiated from hand control unit.
2. Movement initiated from footswitch.
3. Soft start and smooth operation through entire range of travel.
4. Automatic stop in head-end limit position.
5. Automatic stop in foot-end limit position.
6. Movement initiates from Collimator VFD control panel.
7. No movement with opened film cassette door.

Tabletop Longitudinal

Check the following table motions:

1. Movement initiated from Hand Control.
2. Movement initiated from footswitch.

3. Movement initiated from Collimator Housing control panel.
4. Soft startup and smooth operation through entire range of travel.
5. Automatic stop in the head-end limit position.
6. Automatic stop in the middle position.
7. Automatic stop in the foot-end limit position.

Tabletop Latitudinal

Check the following table motions:

1. Movement initiated from the Hand Control.
2. Movement initiated from footswitch.
3. Soft startup and smooth operation through entire range of travel.
4. Automatic stop at each limit position.
5. Automatic stop in the centered position.

Patient Load/Unload

Check the following table motions:

Note: This position equates to the automatic leveling function, and is set at the factory. If you are requested to set this position according to specific customer preference, a procedure for doing so is provided in the Calibration *section of the service manual.*

1. Move the table to random tilt and vertical positions, and X-ray arm to a random position.
2. Press the Patient Load/Unload button on the hand control.
3. Verify that the table and X-ray arm move to the preset positions.
4. Repeat the test using the controls at the Collimator Control panel.

Table and X-ray Arm Position Memory

Table movement circuitry has short-term memory that can store and recall up to three different random Table/X-ray Arm positions. The memory is valid for each position until you power down the system.

Use the following method to test Table Position memory. Use the Table Memory buttons on the Hand Control or Collimator Housing control rather than the Table Footswitch pedal to conduct the test. The Hand Control and Collimator Housing control can store and recall three positions, compared to one for the Footswitch.

1. Move the Table to a random height and tilt, and place the X-ray Arm in a random horizontal position.
2. Press the Save button on the Hand Control.
3. Press one of the three Memory buttons to store the Table's current elevation and tilt, and the X-ray Arm’s current position. The LED next to the Memory button lights when you successfully store this information.
4. Move both the X-ray Arm and Tabletop to another position.
5. Press the Recall button.
6. Press the Memory button you used in step 3.
7. Verify that the Table top and X-ray Arm return to the position you stored in step 3.
8. Repeat steps 1 through 7 to store two more random Table/X-ray Arm positions in the Table's short-term memory.
9. Verify that you can recall all three stored Table/X-ray Arm positions.

Power On Inspections

Initialize without Generator

Note: 400-480 VAC power is still tagged out.

Initialize without generator as follows:

1. Place the workstation power switch in the ON position. Verify that the workstation completes software boot and initialization with no errors reported on the displays.
2. Verify that the two VFDs are lighted, and display no error messages.

   Note: One VFD is located on the Collimator housing, and the other one is on the X-ray Control Console.

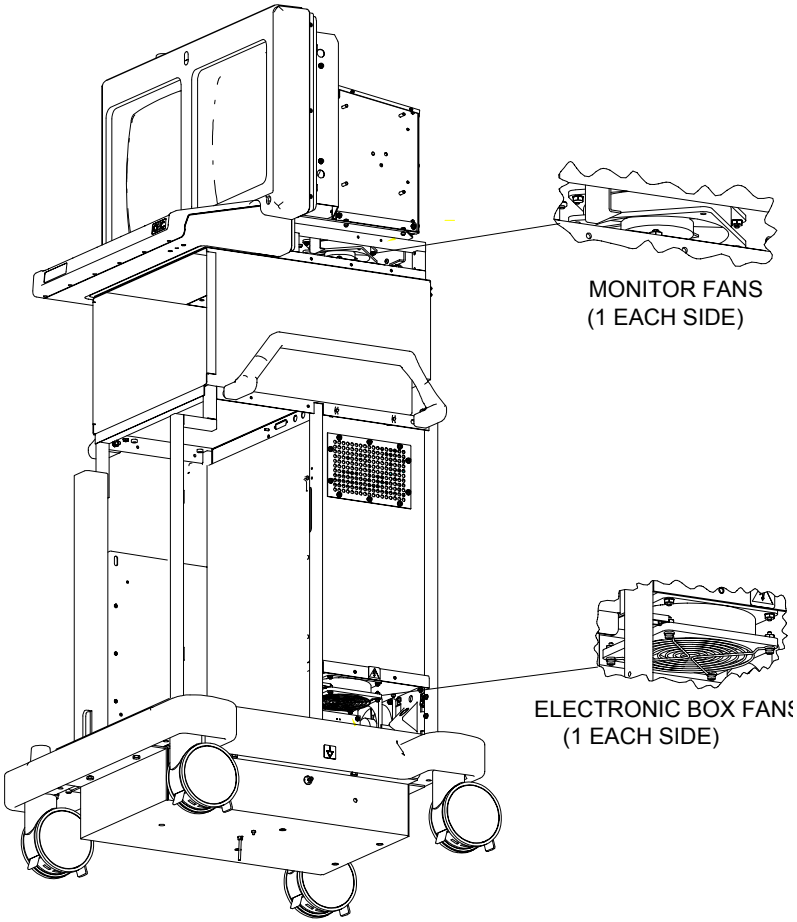
3. Verify that the workstation and tower elapsed time meters are functional.

Fans and Filters

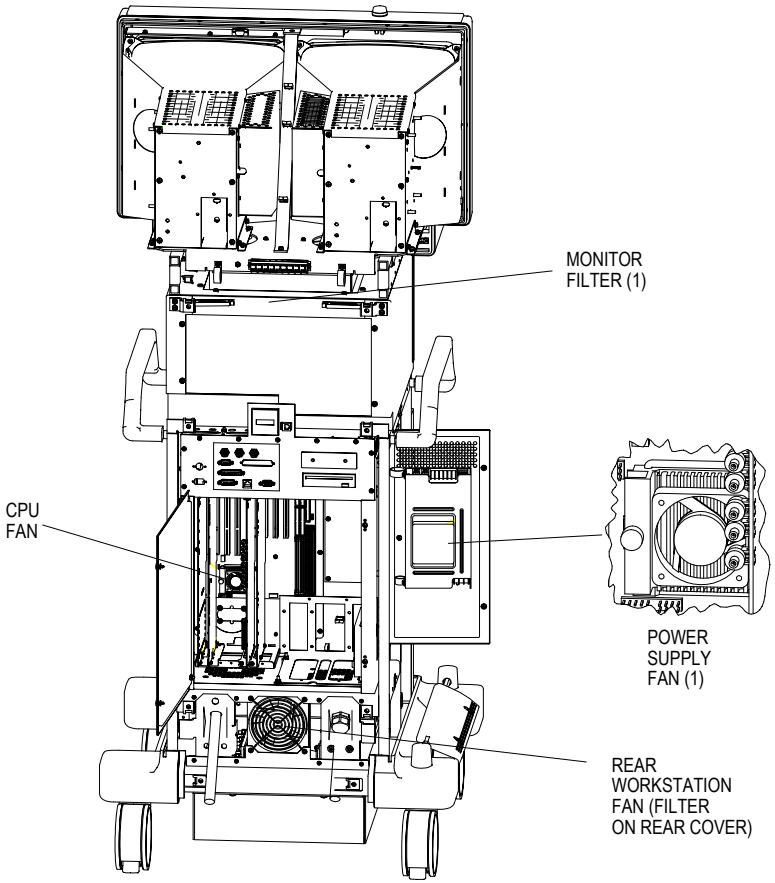
When you finish with the initialization without generator in the previous section, Verify that the cooling fans are operating on the workstation, tower/table, and generator (see the following illustrations).

Inspect the fans with filters in the workstation (no fan filters in the tower/table), cleaning each filter

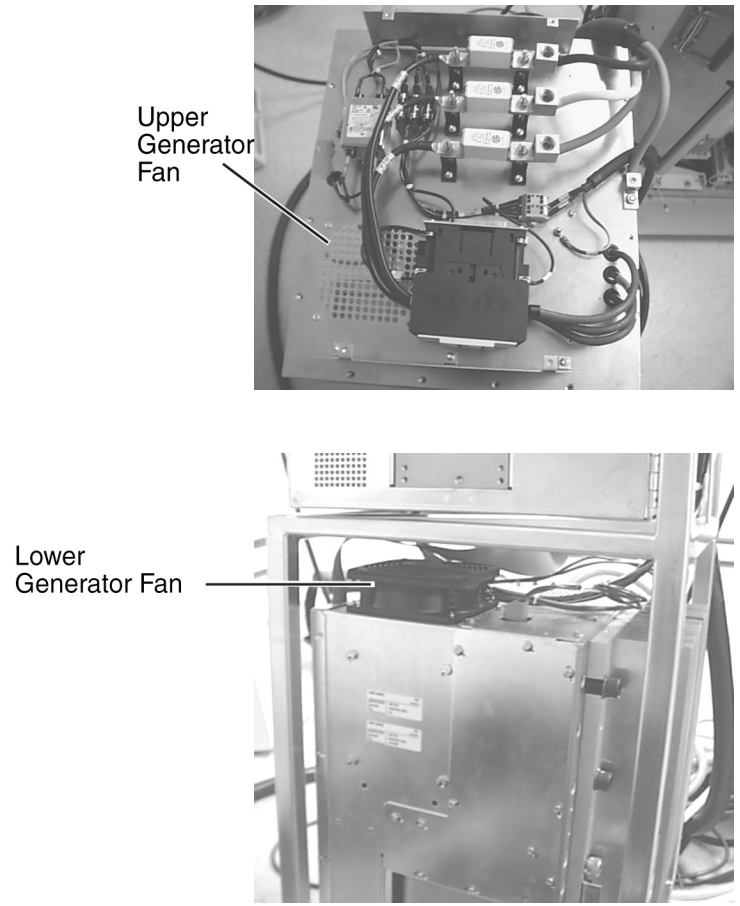
Remove and clean the filter in the X-ray Control Console.



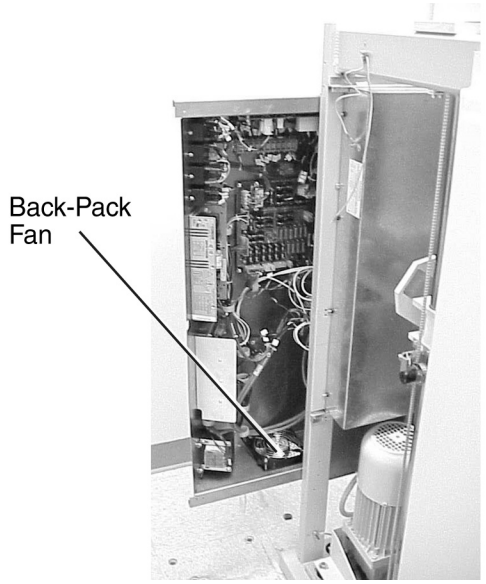
Workstation Fans (View 1 of 2)

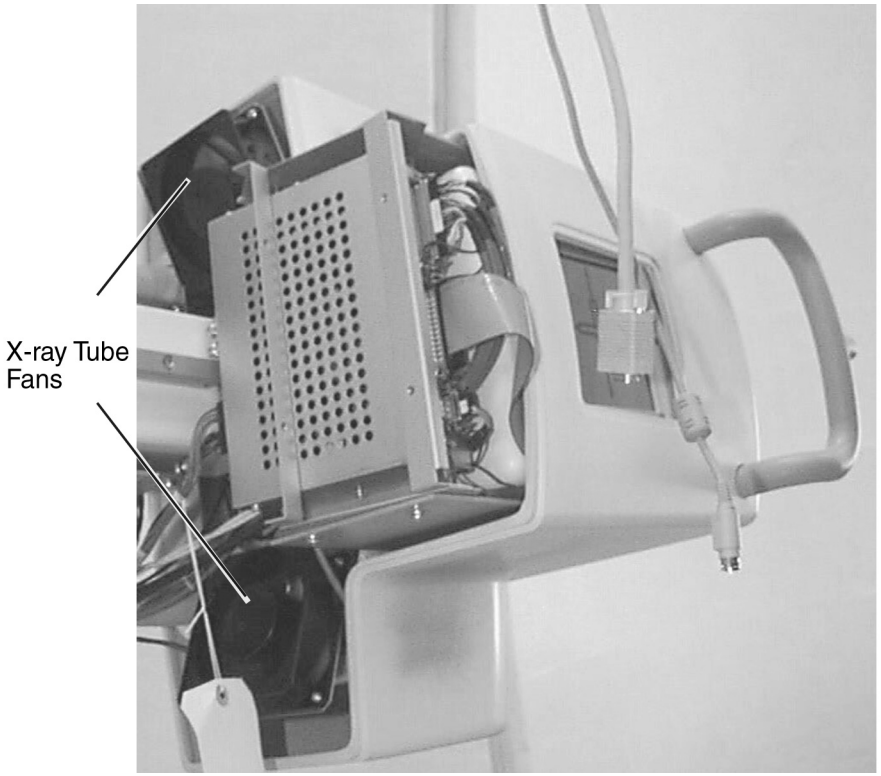


Workstation Fans (view 2 of 2)

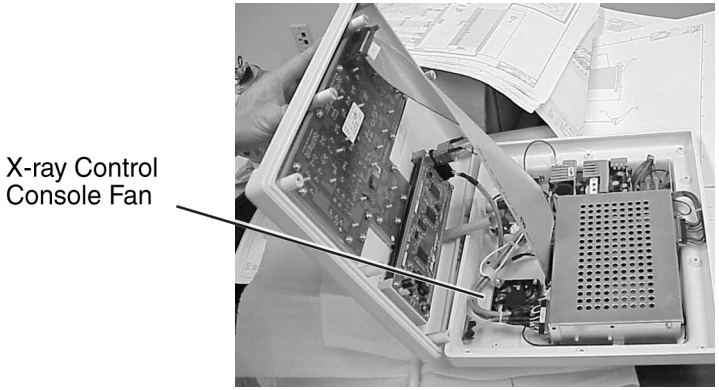


Generator Fans


Back-Pack
Fan



Tower Fans



X-ray Control Console Fan Filter

Table Only Initialization

1. Turn off the workstation.
2. Press SW1, the switch on the back of the tower. Verify that the table boots, and will move; collimator hood, X-ray Control Console, and flat panel displays light up.
3. Press SW1 again to shut off powered-up circuits.

Initialization With Generator

1. If previously removed, install the clear plastic cover on the generator power assembly (the top area of the generator).
2. In the facility power junction box, turn on the 400-480 VAC circuit breaker.
3. Turn on the workstation power switch. Verify the following:
   A. Table boot and motion.
   B. All displays light up, with no errors displayed.

C. Generator boots up (listen for beep in generator).

4. Verify that the X-ray system will take a shot at minimum technique.

Fast Stop

Check Fast Stop switches, located on the table and X-ray Control Console, as follows:

1. Place the workstation power switch in the ON position.
2. Press either of the FAST STOP switches and verify the following:
   - Table motion is disabled
   - The message FAST STOP BUTTON PRESSED – UNLOCK THE BUTTON TO CONTINUE is displayed on the VFD displays.
   - X-ray generation is disabled.
3. Release the FAST STOP switch and reboot by placing the workstation power switch in the OFF position for five seconds and then back to ON.
4. Verify system initialization conditions (see *System Initialization*, above).
5. Verify operation of the other Fast Stop Switch.

Crash and Splash

While applying hand pressure against the side of the Crash and Splash, attempt to drive the table downward. Verify that the table stops, and the message TABLE BLOCKED appears on both VFDs.

Functional Inspection

If any of the requirements of the following inspections are not met, correct them according to the applicable sections of the service manual.

Imaging Functions

WARNING: *Some of the following procedures produce X-rays. Take appropriate precautions.*

Image Orientation

To verify image orientation operation, make sure the Image Invert key inverts and re-inverts the image.

Image Resolution

WARNING: *The following procedure generates X-rays. Take appropriate precautions.*

1. Power on the system by pressing the Workstation on button.
2. Turn on the Collimator Lamp by pressing the Lamp key.
3. Place the Converging Resolution Tool on the table-top, in the X-ray field, at a 45 degree angle to the table.
4. Verify that Fluoro mode is selected, and make an exposure by pressing an X-ray switch.
5. Verify that the video image is displayed on the Workstation's left monitor.
6. Verify that the limiting image resolution is equal to or greater than the minimum line pair/millimeter specifications listed for the system's image intensifier size:

II Size	NORM 60/50 Hz	MAG1 60/50 Hz	MAG2 60/50 Hz
14-inch	≥ 2.0 LP/mm	≥ 2.1 LP/mm	≥ 2.4 LP/mm
16-inch	≥ 1.8 LP/mm	≥ 2.1 LP/mm	≥ 2.4 LP/mm

Flat Panel Display Video, Shift and PIP

The following test requires the Video Scan Converter to have one optional video source.

WARNING: *The following procedure generates X-rays. Take appropriate precautions.*

1. Either generate an X-ray to display on the Workstation's left monitor or access an archived image using the Workstation's Image Directory.
2. Verify that the image displayed on the left monitor is also displayed on the Flat Panel Display (FPD).
3. Set up the optional video source.

Note: A gray image will be displayed on the FPD if the selected video source is not present at the VSC.

4. Press the Video Shift button and verify that the optional source is now displayed on the Flat Panel Display.
5. Press the PIP button and verify that the currently selected video source is now visible in the PIP window.
6. Press Video Shift again and verify that the full screen image and PIP image swap places.
7. Press PIP again and verify that the PIP window closes.

Remote Workstation Operation

1. Press the SAVE key and verify that it saves left monitor image to the Workstation hard-drive.
2. Press the SWAP key and verify the image on the left monitor shifts to the right monitor.

3. Press the MODE switch located on the X-ray Control Console, and verify a dumb beep.

Collimator Control

1. On the collimator housing VFD, press each collimator motion switch and verify that the graphical icon indicates the correct collimator function.
2. On the XCC, press each collimator switch again while pressing the X-Ray ON switch and verify collimator leaves open and close.
3. On both the XCC and collimator housing VFD, press the collimator field light. Very that the light visually defines the area to be exposed to X-rays.
4. Set a collimation size larger than the film size. Press the collimator preset button, verifying that the collimation size reduces to the film size.
5. Set a collimation size smaller than the film size. Press the collimator preset button, verifying that the collimation size does not change.

X-Ray Functions

This section provides testing and verification instructions for the following functions Film Exposure, High-level Fluoro, Pulsed Image, Digital Spot, and Low Dose Mode Operation.

Film Exposure

1. Select FILM mode.
2. Take a 120 kVp 100 mAs shot and verify that three beeps are heard after the exposure and no errors are displayed.
3. Take a 100 kVp 300 mAs shot and verify that three beeps are heard after the exposure and no errors are displayed.

Auto Technique Tracking

1. Select Auto Fluoro mode and the NORM field size.

2. Verify that the kVp tracks accurately according to the following table, as copper filters are taped to the collimator.
3. Record the kVp value in the corresponding table in the *Checklist*.

Copper Filters	KVp range
1	61 kVp ± 3 kVp
2	71 kVp ± 3 kVp
3	79 kVp ± 3 kVp

High-level Fluoro Indication

1. Select HLF mode.
2. Cover the II with 4 layers of lead aprons and press the right Foot/hand switch.
3. Verify that the audible tone beeps at twice the normal rate.
4. Verify that the mA is driven higher than the normal Fluoro limit of 10 mA.

Pulsed Image Indication

1. Select PULSE mode via the XCC.
2. Select a pulse rate of 4 PPS via the Workstation Mode screen and press the right foot/hand switch.
3. Verify that the audible tone beeps at twice the normal rate and the X-ray indicator flashes.
4. Select a pulse rate of 8 PPS via the Workstation Mode screen and press the right foot/hand switch.
5. Verify that the X-ray indicator flashes at approximately twice the rate as the previous step.
6. Verify that the mA is driven higher than the Fluoro limit of 10 mA.

Digital Spot

1. Select DIGITAL SPOT.
2. Press the right hand/foot switch.
3. Verify that a short-term HLF exposure is taken and automatically saved to the Workstation hard drive.
4. Remove the 4 layers of lead aprons from the II.

Low Dose Mode Operation

1. Press the Low Dose key. The corresponding LED will illuminate when Low Dose mode is selected.
2. Press the Low Dose key again to deselect Low Dose mode. The corresponding LED will extinguish.
3. Press and hold the ALARM RESET key for approximately 2 seconds. Verify the Fluoro time displayed on the Tower/table Control Panel is reset to zero.

Beam Alignment Test

This section provides verification instructions for verifying alignment of the Fluoro and Film beams.

If a film processor is not located on site, is not functional, or is unavailable, it will not be possible to perform this test. GE OEC may follow up with the customer to verify any reasons listed for not performing the beam alignment test. Record the information asked for in the corresponding sections of the *Checklist*.

WARNING *The following steps produce X-rays. Use appropriate precautions.*

Omit the Film portion of this procedure when verifying Beam Alignment on systems without film capability. For regulatory purposes, SID measurements are: Film = 45-inches, Fluoro = 47-inches. If Beam Alignment Verification fails, perform a Beam Alignment procedure. Refer to the Calibration section of the 2800 Service Manual.

Fluoro Alignment

1. With Auto Fluoro enabled, take a NORM field shot and verify all four leaves show in the image.
2. Take a MAG1 field shot and verify all four leaves show in the image.
3. Take a MAG2 field shot and verify all four leaves show in the image.
4. Turn on the Collimator Lamp.
5. Select Fluoro Mode and verify you can collimate to less than 5 cm x 5 cm, as indicated by the illuminated area.

Film Alignment

1. Set the technique to 40 kVp @ 100 mAs and enable AEC mode.
2. Fully open the collimator leaves and collimate the leaves in approximately 1-inch.
3. Take a film exposure and then develop the film.
4. Fold the film and verify longitudinal centering is within 0.45 inches (1% x 45” film SID).
5. Fold the film and verify lateral centering is within 0.45 inches.
6. Take another film shot with the collimator leaves fully open. Verify at least three edges of the X-ray beam can be seen on the film.
7. Turn on the Collimator Lamp.
8. Select Film Mode and verify you can collimate to less than 5 cm x 5 cm, as indicated by the illuminated area.

Dose Rate

Entrance exposure is the amount of radiation available at the entrance point of patient anatomy. Entrance exposure is measured 12" (or 30 cm) above the surface of the Image Intensifier in the center of the X-ray beam. This measurement is used to represent the average thickness of patient anatomy. Refer to the 2800 System Service Manual for directions on performing the Entrance Exposure calibration.

Dose Rate (MAX. kV & mA)

Using a dosimeter for the measurements, record the Actual Dose Rate, max. kV and mA, on the PM Inspection Checklist form. Limit is < 9.26 R/min.

High Level Fluoro (HLF)

Using a dosimeter for the measurements, record the Actual Dose Rate, max. kV, HLF mode, on the PM Inspection Checklist form. Limit is < 18 R/min.

Workstation Controls

WARNING *This procedure produces X-rays. Take appropriate precautions.*

1. Verify the EDGE ENHANCEMENT function displays an indicator bar and that the amount of edge enhancement can be increased and decreased.
2. Verify the NOISE FILTER function displays an indicator bar and that the amount of filtering can be increased and decreased. The noise in the image should decrease as noise filtering is increased.
3. Verify the ZOOM function displays a square box known as the region of interest (ROI) and that you can magnify the ROI by touching the 2X and 4X buttons.
4. Verify the NEGATE function reverses the light and dark values on the image displayed on the left monitor.

5. Verify the CONTRAST function displays an indicator bar and that the amount of contrast can be increased and decreased.
6. Verify the BRIGHTNESS function displays an indicator bar and that the amount of brightness can be increased and decreased.
7. Verify the AUTO CONTRAST/BRIGHTNESS automatically selects the optimum values of contrast and brightness.
8. Verify the SWAP function exchanges images from the left and right monitors (need to have two different images on the left and right monitors).
9. Verify the SAVE function saves the image on the left monitor to the Workstation's hard drive.
10. Verify the PATIENT INFORMATION function activates the Patient Information screen. Enter patient information, display scheduled patients, display saved exams screen.
11. Verify the IMAGE DIRECTORY function allows you to review, print, and archive stored images and dose information.
12. Verify the IMAGE ANNOTATION function allows you to place markers, add comments and crop images.
13. Verify the SPECIAL APPLICATIONS function allows access to additional applications, if available.
14. Verify the CUSTOMIZE function allows access to the Customize screen.
15. Switch on the system. Initiate movement through the entire movement path.

Options Testing

Refer to the Workstation or UroView 2800 Operator's Guide for operating instructions if necessary. Check the appropriate boxes in the corresponding section of the *Checklist*. Ignore any following sections that are non-applicable to the system.

High Capacity Disk Test

1. Using the Image Directory verify that dynamic and static image(s) can be saved to disk.

VCR Test

1. Verify the VCR RECORD function.
2. Verify the VCR PLAY function.

IR Transmitter Test

1. Press the Remote Control Screen key and verify that the remote control screen displays on the monitor.
2. Use the cursor control to move the cursor to an executable button and press the ENTER key.
3. Press the EXIT key to exit.

Digital Hardcopy Camera test

1. Verify operation of the digital hardcopy camera. Refer to the Operator's Guide Supplement if necessary.

Instant Film/Paper (Onboard) Printer

1. Remove the shipping pins from the printers front ventilation grill. There are two pins connected with tape which secure the thermal printhead.

2. Verify that an image can be printed to the Instant Film/Paper Printer. Refer to the Operator's Guide Supplement if necessary.

Thermal Printer Test

Verify an image can be printed to the thermal printer.

DICOM

1. Verify images can be archived and printed via the DICOM interface.
2. Verify that scheduled exams can be downloaded via the DICOM interface.

Lubrication

The following table motion systems require service once each six months:

- Lift and Tilt Drive
- I.I./X-ray Arm Carriage
- Latitudinal Drive
- Longitudinal Drive

Warning: *The following procedures require operation of the table with access covers removed. While working inside the machine, follow applicable lockout/tag-out steps. Keep all body parts and tools clear while motors are running.*

Lift and Tilt Drive

1. Verify that drive screws, guide shafts, spindle nut slides, and roller rails are free of any debris that could cause damage (see illustrations below).
2. Apply TUNAP TUNGREASE BS along the full length of the drive screws.
3. Operate the motors through a full cycle of motion, so that parts run on their mating surfaces and grease is spread thoroughly. Wipe excess grease from non-mating drive screw surfaces with a clean cloth.
4. Repeat this process through at least 6 cycles to thoroughly apply grease.
5. Wipe off old grease from guide shafts, spindle nut slides, and roller rails. Apply a thin coat of fresh TUNAP TUNGREASE BS along the length of each item.

I.I./X-ray Arm Carriage

1. If not done previously, position the table at full vertical, and remove the cover from below the I.I./X-ray Arm Carriage.
2. Verify that drive screw and roller rail surfaces are free of any debris that could cause damage (see illustrations below).

3. Apply TUNAP TUNGREASE BS along the full length of the drive screw.
4. Operate the motor through a full cycle of motion, so that parts run on their mating surfaces and grease is spread thoroughly. Wipe excess grease from non-mating drive screw surfaces with a clean cloth.
5. Repeat this process through at least 6 cycles to thoroughly apply grease.
6. Wipe off old grease from roller rails. Apply a thin coat of fresh TUNAP TUNGREASE BS along the length of each rail.

Latitudinal Drive

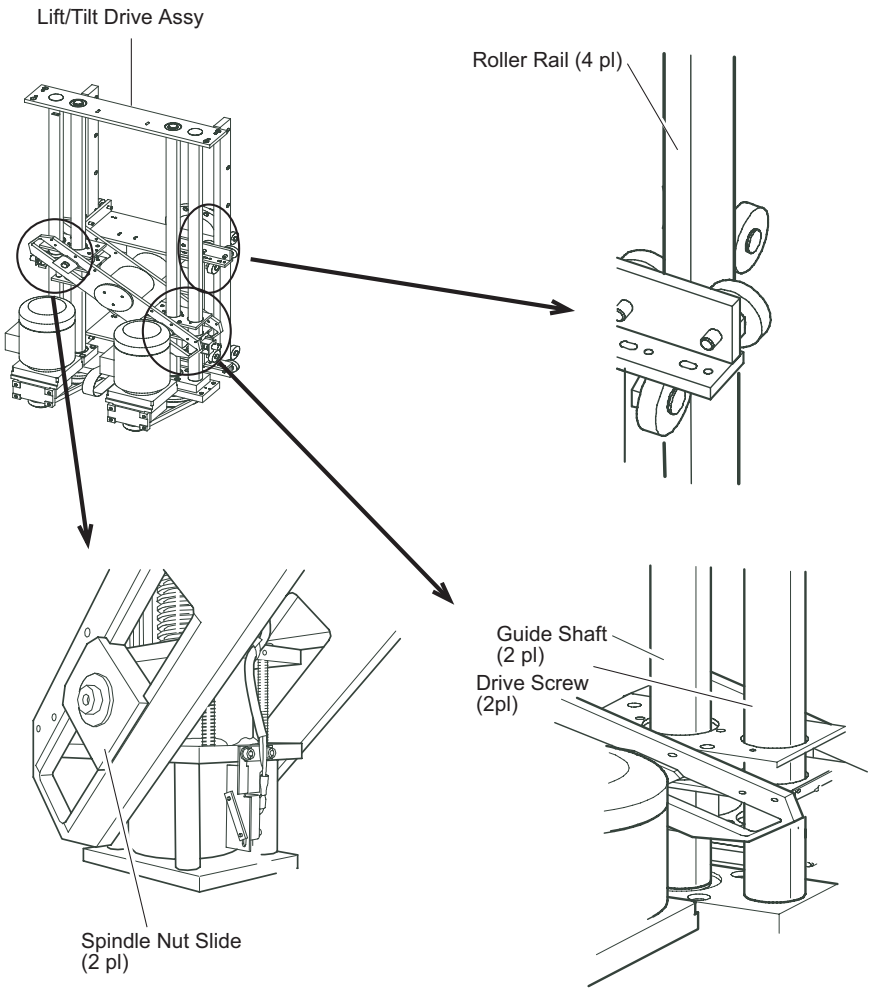
1. If not done previously, position the table at full vertical, and remove the cover from below the Latitudinal Drive Assy.
2. Verify that the drive screw and guide shaft are free of any debris that could cause damage (see illustrations below).
3. Apply TUNAP TUNGREASE BS along the full length of the drive screw.
4. Operate the motor through a full cycle of motion, so that parts run on their mating surfaces and grease is spread thoroughly. Wipe excess grease from non-mating drive screw surfaces with a clean cloth.
5. Repeat this process through at least 6 cycles to thoroughly apply grease.
6. Wipe off old grease from guide shaft. Apply a thin coat of fresh TUNAP TUNGREASE BS along the length.

Longitudinal Drive

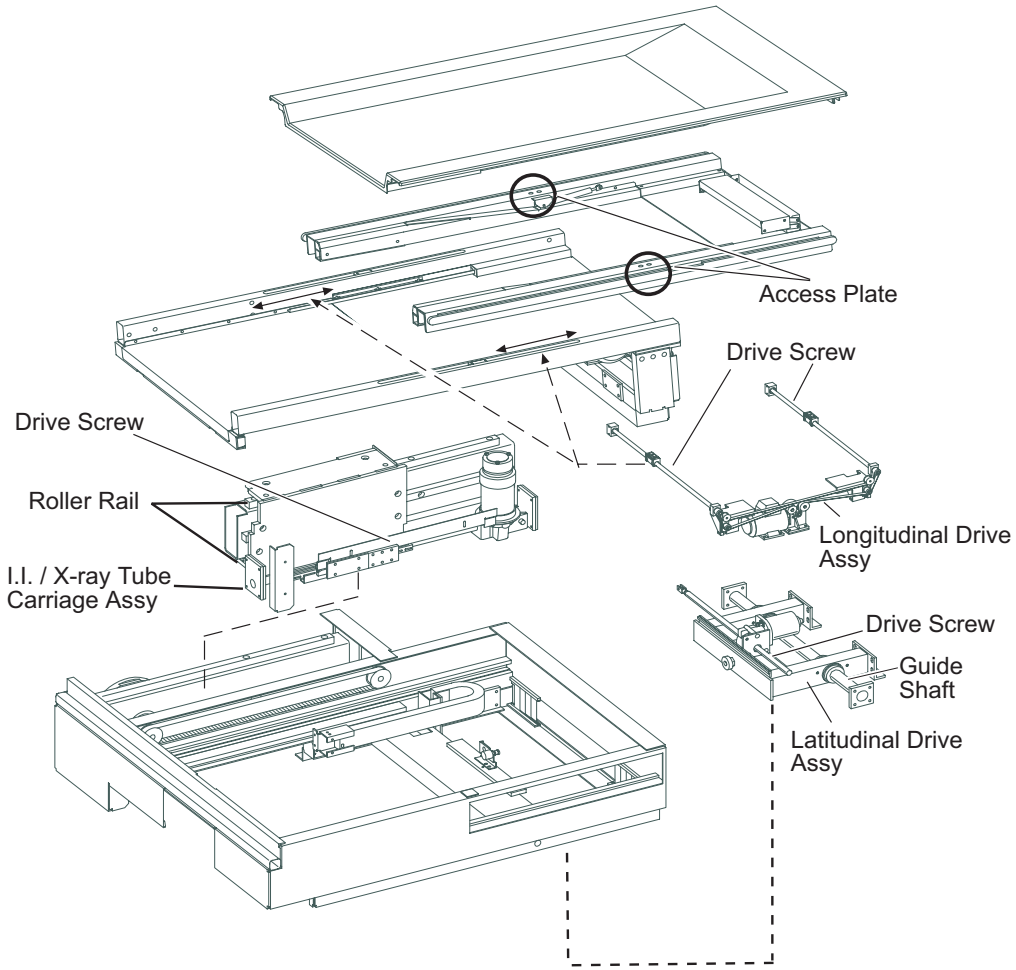
1. Move table to horizontal position. Raise foot end of tabletop (supported by gas spring—see illustration below). Remove access plates located midway along table rails.

Warning: *In the next step especially, follow applicable lockout/tag-out steps. Keep all body parts and tools clear while motors are running.*

2. Through access openings, apply TUNAP TUNGREASE BS along the full length of the drive screws.
3. Operate the motor through a full cycle of motion, so that parts run on their mating surfaces and grease is spread thoroughly. Wipe excess grease from non-mating drive screw surfaces with a clean cloth.
4. Repeat this process through at least 6 cycles to thoroughly apply grease.
5. Re-install access plates and lower the tabletop.



Tower/Table Lubrication Points (View 1 of 2)



Tower/Table Lubrication Points (View 2 of 2)

Note: Disassembled views are for illustration purposes only.

Miscellaneous

Dose Area Product Calibration

The following paragraphs explain how to use the Remote Utilities Tool to calculate the Dose Area Product (DAP). DAP is a calculation of surface dose at a given distance from the X-ray tube multiplied by the surface area receiving the dose. DAP is equal for all planes that are perpendicular to the beam axis.

***Note**: DAP is a measurement of radiation from the X-ray tube, and does not represent the radiation being absorbed by the patient.*

1. Connect the cable from the Service Monitor to the VGA port on the Workstation's rear panel.
2. Connect the Service Monitor's AC power plug to the nearest AC receptacle and turn on the monitor.
3. Plug the service keyboard into the keyboard connector on the Workstation rear panel.
4. Start the system and allow it to boot completely.
5. Use serial cable (00-901559) to connect the serial port on the laptop to the ARCNet connector on the rear of the Workstation. Using your laptop open the Utility Suite.
6. Click on the *VIEW* pull-down menu and select RUT
7. Click on the *CONNECT* pull-down menu and select *SYSTEM*.
8. Click on the *FILE* pull-down menu, and select: *OPEN*, *FROM SYSTEM*, *BOTH*.
9. From the RUT main menu, click the *Dose Area Product Calibration form*. The Dose Area Product screen appears.
10. Place the Dosimeter's Ion Chamber on top of the table.
11. Open the collimator leaves completely, so that you cannot see the leaves when you take an X-ray.
12. Turn the Collimator Lamp on and center the ion chamber within the illuminated area.
13. Set the Dosimeter to read the dose rate in mR/s.
14. If necessary, enter the current temperature and barometric pressure into the Dosimeter.

15. Select Manual Fluoro mode and the NORM field.
16. On the Service Keyboard, press Ctrl+Alt+M (all three keys at the same time).
17. On the Service Keyboard, press Ctrl+Alt+M (all three keys at the same time). Then press the x key on the Service Keyboard and verify on the Service Monitor that the leaves are 0 (+1/-10)% closed. Press the x key only one time.
18. Adjust the technique to 40 kVp @ 5 mA and take an exposure.
19. Allow the Dosimeter readings to stabilize for a few moments and then read the dose rate on the Dosimeter. Enter the dose rate and mA values into the corresponding Dose Rate and mA fields.
20. Set the kV and mA to each of the following techniques and take an X-ray. Read the Dosimeter for each X-ray shot and enter the dose rate and mA values into the Dose Rate and mA field that corresponds to the kV.
    - 50 kVp @ 5 mA
    - 60 kVp @ 4 mA
    - 80 kVp @ 3 mA
    - 100 kVp @ 2 mA
    - 125 kVp @ 2 mA
21. Once you have entered all six Dosimeter readings, click the *Calculate Coefficients* button. The system calculates the A, B, and C coefficients and displays each in its respective field.
22. Click on the *FILE* pull-down menu and select: *SAVE, TO SYSTEM, BOTH*.
23. Press the X key on the service keyboard to enable DAP if needed.

Battery Replacement

Every two years, replace the Workstation Motherboard PCB Battery or PC Card battery (Coin type CR2032, 3.0 Volt, Lithium, P/N 74-122905-00).

1. Locate the sticker indicating when the battery was last replaced.

Note: If a sticker is not present, determine the system date of manufacture by locating the System Regulatory Label.

2. If two years has elapsed or will have elapsed before the next scheduled service date, replace the battery and current sticker. Indicate the date you replaced the battery on the sticker.

Table Maintenance

1. Check for bearing play (.004 inch max), adjust as required, and clean the guide rails for the following table drive systems:
   A. Lift and Tilt
   B. I.I/ X-ray Arm Assembly
   C. Lateral and Longitudinal
   D. Cassette Carriage
   E. Horizontal Cross-Arm
2. Check all drive belts for wear, cracking. Check tension, and adjust if required (see Service Manual).

Completing the PM

Reinstall the Covers

When all necessary steps are complete and access to components beneath the covers is no longer required, reinstall all previously removed covers in reverse order, from which they were removed.

Torx Crestcup Torque Specifications:

Torx Screw Size	Nominal Torque value	Acceptable Range
4-40	6 lbs./in	5-8 lbs./in
6-32	15 lbs./in	13-16 lbs./in
8-32	22 lbs./in	21-24 lbs./in
10-32	30 lbs./in	28-31 lbs./in

Final Power-On

Turn on all facility power and perform the steps of *Power-On,* previously in this procedure

PM Checklist Printing

To complete the PM Checklist perform the following:

1. If not already done, finish making your electronic entries.
2. Save the PM Checklist to your hard disk using the System ID of the 2800 system.
2. Print the Checklist and sign it.
3. Obtain the customer's signature.

4. Make two photocopies of the PM Checklist.
5. Mail the copy with the original signature to GE OEC Medical Systems, Inc.
6. Leave a copy with the customer.
7. Keep one copy for your records.

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